

In the Claims:

Please amend Claims 1, 2, 27, and 38. A complete copy of the claims including marked-up versions of each claim which is amended in this Amendment D appears below.

1     1.     (Currently Amended) A solid state laser gain medium having first and second ends  
2     along a laser optical axis in which each end is profiled concave to provide a level of  
3     thermal lens compensation at a desired operating pump power such that the beam has a  
4     beam quality factor  $M^2$  maximized at the desired operating pump power, wherein the  
5     solid state laser gain medium is ~~operable~~ configured to operate in a laser oscillator cavity  
6     that is optically symmetrical and includes flat cavity end reflectors.

1     2.     (Currently Amended) A solid state laser gain medium as defined in Claim 1,  
2     wherein the solid state laser gain medium is ~~operable~~ configured to operate in a laser  
3     oscillator cavity arranged to incorporate a Q-switch or further gain modules.

1     3.     (Previously Presented) A solid state laser gain medium as defined in Claim 1, in  
2     which the solid state laser gain medium is formed of Nd:YAG.

1     4.     (Previously Presented) A laser oscillator cavity including a solid state laser gain  
2     medium as defined in Claim 1.

5. (Cancelled).

1 6. (Previously Presented) A laser oscillator cavity as defined in Claim 4, further  
2 comprising:  
3 a Q-switch having first and second acousto-optic cells in respective first and  
4 second non-parallel polarization orientations, wherein at least one of said first and second  
5 acousto-optic cells has a reflective end forming a cavity end reflector.

7. (Cancelled).

1 8. (Previously Presented) A laser oscillator cavity as defined in Claim 4, further  
2 comprising:  
3 a frequency converter; and  
4 a frequency selective reflector between the solid state laser gain medium and the  
5 frequency converter.

1 9. (Previously Presented) A laser including a solid state laser gain medium as defined  
2 in Claim 1.

1 10. (Previously Presented) A laser as defined in Claim 9, further comprising:  
2 a side-pumping diode element.

11-22. (Cancelled).

1 23. (Previously Presented) A laser ablation device comprising a laser as defined in  
2 Claim 9.

24-25. (Cancelled).

1 26. (Previously Presented) A laser amplifier including a solid state laser gain medium  
2 as defined in Claim 1, said laser amplifier further comprising:  
3 a laser cavity; and  
4 an amplifying module external to the laser cavity, said amplifying module sharing  
5 a common axis of emission with said laser cavity and comprising an amplifier gain  
6 medium having first and second ends along said axis of emission;  
7 whereby at least one of said first or second ends of said amplifying module is profiled to  
8 produce a lensing effect so as to directly couple light from said laser cavity into said  
9 amplifying module.

1 27. (Currently Amended) A laser amplifier as defined in Claim 26, wherein one or  
2 both of said first or second ends of said amplifying module are profiled to form an  
3 amplifier lens having a predetermined focal length in order to maximize the beam quality

- 4    factor  $M^2$  of the laser cavity at a desired pump power, and wherein the amplifier lens is  
5    one of a refractive lens, a diffractive lens, or a GRIN lens.

28-30. (Cancelled).

- 1    31.    (Previously Presented) A laser amplifier as defined in Claim 27, wherein said at  
2    least one end of said solid state laser gain medium is profiled to form a first lens having a  
3    focal length that is substantially equal to the focal length of said amplifier lens.

- 1    32.    (Previously Presented) A laser amplifier as defined in Claim 26, whereby said  
2    laser gain medium lens and said amplifier gain medium lens are concavely profiled.

- 1    33.    (Previously Presented) A laser amplifier as defined in Claim 26, wherein said laser  
2    gain medium and said amplifying gain medium are pumped simultaneously, and wherein  
3    said laser gain medium pump and said amplifying pump have equal power.

34.    (Cancelled).

- 1    35.    (Previously Presented) A laser amplifier as defined in Claim 26, in which an input  
2    surface to the amplifying module is tilted.

36. (Cancelled).

37. (Previously Presented) A laser amplifier having:

a laser cavity; and

an amplifying module external to the laser cavity, said amplifying module sharing

a common axis of emission with said laser cavity and comprising a laser gain medium

having first and second ends along said axis of emission;

whereby at least one of said first or second ends is profiled so as to directly couple light

from said laser cavity into said amplifying module;

wherein said laser gain medium and said amplifying medium are pumped simultaneously;

wherein in said module for an amplifier medium comprising a rod of diameter  $D_R$ , length

$L_R$ , refractive index  $n_L$ , refractive index of air  $n_{air}$ , and thermal focal length  $f_{th}$  arranged

to receive an input beam from a laser having waist distance  $d_0$  from the input rod end,

the rod is profiled with a radius of curvature  $R$  given approximately by

$$R = \frac{d_0(4f_{th} - L_R)(n_L - n_{air})}{n_L(4f_{th} - L_R - 2d_0)}.$$

38. (Currently Amended) A method of making a solid state laser gain medium having

first and second ends and further comprising flat cavity end reflectors along a laser

3 optical axis, said solid state laser gain medium being for use in an optically symmetrical  
4 laser oscillator cavity arranged to produce a laser beam, said method comprising:  
5 profiling concavely each end of the solid state laser gain medium to provide a  
6 level of thermal lens compensation at a predetermined operating pump power in order to  
7 maximize the beam quality factor  $M^2$  of the beam at said desired operating pump power.

1 39. (Previously Presented) A method of designing a laser amplifier having a profile as  
2 defined in Claim 37.

40-42. (Cancelled).

1 43. (Previously Presented) A laser assembly comprising a gain medium as defined in  
2 Claim 1 and an amplifier as defined in Claim 26 coupled therewith.

1 44. (Previously Presented) A module as defined in Claim 33, in which, for an  
2 amplifier medium comprising a rod of diameter  $D_R$ , length  $L_R$ , refractive index  $n_L$ ,  
3 refractive index of air  $n_{air}$ , and thermal focal length  $f_{th}$  arranged to receive an input beam  
4 from a laser gain medium having waist distance  $d_0$  from the input rod end, the rod is  
5 profiled with a radius of curvature  $R$  given approximately by  $R = \frac{d_0(4f_{th} - L_R)(n_L - n_{air})}{n_L(4f_{th} - L_R - 2d_0)}$ .